Docket No.: 050395-0028 **PATENT**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of	:	Customer Number: 20277
Masuhiro NATSUHARA, et al.	:	Confirmation Number: 3109
Application No.: 09/339,826	:	Group Art Unit: 1755
Filed: June 25, 1999	:	Examiner: Karl E. Group

For: CERAMIC BASE MATERIAL

DECLARATION UNDER 37 C.F.R. § 1.132

Mail Stop Amendment
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

I, Masuhiro Natsuhara, hereby declare and say as follows:

1. I am the first named inventor of the above identified application and a person having ordinary skill in the art as evidenced by my attached *Curriculum Vitae*.

2. At my direction and under my supervision, the testing reported herein was conducted.

3. Samples 30 to 32 include a porous boron nitride (BN) sheet that was used as a setter having a thickness of 0.5 mm for sintering an aluminum nitride (AlN) ceramic base material, which includes an AlN powder having an average particle diameter of 1 μm and a sintering agent of Y_2O_3 powder having an average particle diameter of 0.6 μm. Samples 33 to 35 include porous carbon that was used as a setter for sintering an AlN ceramic base material, which includes an AlN powder having an average particle diameter of 1 μm and a sintering agent of Y_2O_3 powder having an average particle diameter of 0.6 μm. Table 1a shows the combination and weight ratios of powders for individual samples.

4. As comparative examples, Sample 36 includes dense glassy carbon that was used as a setter for sintering an AlN ceramic base material, which includes an AlN powder having an average particle diameter of 1 μm and a sintering agent of Y_2O_3 powder having an average particle diameter of 0.6 μm, and Sample 37 includes dense BN that was used as a setter for sintering an AlN ceramic base material, which includes an AlN powder having an average particle diameter of 1 μm and a sintering agent of Y_2O_3 powder having an average particle diameter of 0.6 μm.

5. The samples were heat-treated at 850° C for an hour in an non-oxidative atmosphere.

6. After the heat treatment, the magnitude of distortion (warp) and increment in the warp were measured for the sintered bodies in accordance with the method described in the specification at page 13, line 22 – pg. 14, line 17 and in Fig. 1.

7. The warp after sintering ranged from 8.4×10^{-2} to 9.1×10^{-2} μm/mm for Samples Nos. 30-32. The warp after sintering for Sample Nos. 33-35 ranged from 8.2×10^{-2} to 9.0×10^{-2} μm/mm. The warp after sintering for Comparative Sample No. 36 was 10.8×10^{-2} μm/mm and for Comparative Sample No. 37 was 11.2×10^{-2} μm/mm. The values for the warp after sintering for Samples Nos. 30-37 are shown in Table 2a.

8. The increment in the warp after heat treatment for Samples Nos. 30-32 ranged from 0.9×10^{-2} μm/mm to 1.2×10^{-2} μm/mm. The increment in warp for Samples Nos. 33-35 ranged from 1.0×10^{-2} μm/mm to 1.2×10^{-2} μm/mm. The increment in warp for Comparative Sample No. 36 was 6.3×10^{-2} μm/mm and for Comparative Sample No. 37 was 6.5×10^{-2} μm/mm. The values for the increment in the warp after heat treatment for Samples Nos. 30-37 are also provided in Table 2a.

9. The increment in the warp after the heat treatment becomes larger when the material of the setter is denser.

10. The undersigned hereby declares that all statements made herein based upon knowledge are true, and that all statements made based upon information and belief are believed to be true; and further, that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

April 2, 2008 — Masuhiro Natsuhara

Date — Masuhiro Natsuhara

Table 1a

Sample No.	Combination and weight ratios of powders (wt.%)						Charging method for sintering		Sintering atmosphere and temperature		
	AlN	Si_3N_4	Y_2O_3	CaO	Nd_2O_3	Yb_2O_3	Setter		Gas	r (%)	Temperature (°C)
							Material and type	Rmax (μm)			
30	95.0	-	5.0	-	-	-	BN sheet	5	N_2	15	1850
31	99.0	-	1.0	-	-	-	BN sheet	5	N_2	15	1850
32	99.5	-	0.5	-	-	-	BN sheet	5	N_2	15	1850
33	95.0	-	5.0	-	-	-	Porous Carbon	4	N_2	15	1850
34	99.0	-	1.0	-	-	-	Porous Carbon	4	N_2	15	1850
35	99.5	-	0.5	-	-	-	Porous Carbon	4	N_2	15	1850
36	95.0	-	5.0	-	-	-	Glassy Carbon	4	N_2	15	1850
37	95.0	-	5.0	-	-	-	Dense BN	4	N_2	15	1850

Table 2a

Sample No.	Quantity ratio of sintering agents between the two surfaces of sintered body (a/b)	Warp after the sintering (μm/mm)	Increment in the warp after heat treatment (μm/mm)
30	1.10	8.4 × 10-2	1.2 × 10-2
31	1.15	8.6 × 10-2	1.1 × 10-2
32	1.21	9.1 × 10-2	0.9 × 10-2
33	1.08	8.2 × 10-2	1.2 × 10-2
34	1.13	8.5 × 10-2	1.1 × 10-2
35	1.20	9.0 × 10-2	1.0 × 10-2
36	1.42	10.8 × 10-2	6.3 × 10-2
37	1.45	11.2 × 10-2	6.5 × 10-2

Note: Sample Nos. 36 and 37 are comparative examples.